SYNOPSIS OF THE PEDICULATE FISHES OF THE EASTERN COAST OF EXTRATROPICAL NORTH AMERICA.

By THEODORE GILL.

The present sketch of the North American Pediculate Fishes is extracted from a general work on the fishes of the corresponding region, which it is proposed to publish in instalments and as convenience may dictate. The issue of that relative to the Pediculates seems to be at least as much called for as any other on account of the recent additions to our knowledge of the group and the rarity of the volumes in which those additions have been recorded. The recent discovery, too, of so many northern and deep-sea forms not far from our eastern coast renders it possible that any of the types herein enumerated may be found in the same waters, and the present synopsis may lead to their ready identification. The knowledge of the northern forms is chiefly due to Dr. Lütken.

Synopsis of Families.

1*a*. Branchial apertures in or behind the inferior axillæ of the pectoral fins; anterior dorsal ray superior; mouth more or less opening upwards; the lower jaw generally projecting beyond or closing in front of upper.

2*a*. Pseudobrachia with three actinosts; pseudobranchiæ not developed.

3*a*. Pectoral members geniculated, with elongated pseudobrachia; ventral fins developed ..... ANTENNARIIDÆ.

3*b*. Pectoral members not geniculated, with moderate pseudobrachia; ventral fins suppressed ..... CERATIIDÆ.

2*b*. Pseudobrachia with two actinosts; pseudobranchiæ developed.

3. Pectoral members little geniculated, but with elongated pseudobrachia; ventral fins separated by wide interval ..... LOPHIIDÆ.

1*b*. Branchial apertures in the superior axillæ of the pectoral fins; anterior dorsal ray in a cavity overhung by the anterior margin of the forehead; mouth subterminal or inferior, the lower jaw being generally received within the upper ..... MALTHEIDÆ.

ANTENNARIIDÆ.

Pediculates with elongated geniculate pseudobrachia, provided with three actinosts, *i. e.*,

Pediculates with a compressed body; the mouth opening upwards; the branchial apertures perforated in the lower axils of the pectorals; no pseudobranchiæ; the dorsals represented by (1) at least a frontal or superior rostral spine, and (2) an oblong soft dorsal; the pectoral members distinctly geniculated, with elongated pseudobrachia and three actinosts; and with well developed and approximated ventrals.

ANTENNARIINÆ.

Antennariids with the body oval and with tumid abdomen, the head compressed, the mouth quite large; teeth on the palate as well as jaws; spinous dorsal represented by three spines; soft dorsal quite elevated; and pelvic bones elongated.

PTEROPHRYNE.*

Antennariines with skin naked and smooth; caudal peduncle free; mouth oblique; dorsal spines completely exserted; soft dorsal and anal expanded vertically; pectorals and wrists slender, and ventrals elongated.

Pterophryne histrio.

Common Frog-fish. Mouse-fish.

1758—Lophius histrio, *Linné*, Systema Naturæ, 10. ed., p. 237; 12. ed., t. 1, p. 403; Gmel. ed., t. 1, p. 1481.
1815—Lophius gibbus, *Mitchill*, Trans. Lit. and Phil. Soc. N. Y., v. 1, pl. 4, f. 9.
1837—Chironectes pictus, *Cuv. & Val.*, Hist. Nat. des Poissons, t. 12, p. 393, pl. 363.
1837—Chironectes tumidus, *Cuv. & Val.*, Hist. Nat. des Poissons, t. 12, p. 397.
1837—Chironectes lævigatus, *Cuv. & Val.*, Hist. Nat. des Poissons, t. 12, p. 399.
1837—Chironectes nesogallicus, *Cuv. & Val.*, Hist. Nat. des Poissons, t. 12, p. 401.
1837—Chironectes marmoratus, *Cuv. & Val.*, Hist. Nat. des Poissons, t. 12, p. 402.
1839—Chironectes lævigatus, *Storer*, Boston Journ. Nat. Hist., v. 2, p. 383; Rep. Ich. and Herp. Mass., p. 73.
1842—Chironectes lævigatus, *DeKay*, Zoology of New York, Fishes, p. 165, pl. 27, f. 83.
1842—Chironectes gibbus, *DeKay*, Zoology of New York, Fishes, p. 164, pl. 24, f. 74.
1853—Chironectes lævigatus, *Storer*, Mem. Am. Acad. Arts and Sc., n. s., v. 5, p. 270; Hist. Fishes Mass., p. 104, pl. 18, f. 3.
1861—Antennarius marmoratus, *Günther*, Cat. Fishes in Brit. Mus., v. 3, p. 185.
1863—Pterophryne lævigatus, *Gill*, Proc. Acad. Nat. Sc. Phila., [v. 15,] p. 90.
1878—Pterophryne histrio, *Gill*, Proc. U. S. Nat. Mus., v. 1, p. 216.

Pterophryne with the skin of head and body, as well as dorsal fins, emitting cutaneous tentacles, which are generally most numerous on the second and third dorsal spines and abdomen; the first dorsal spine short and filamentous with a smaller tip surmounted by a small tag; the color light for the ground, with spotted white dots and marked with blackish brown around the ocular region, with several dark radii diverging from the eyes, and on the fins more or less interrupted blackish bands, five or six obliquely crossing the soft dorsal, three rectangularly crossing the anal, and others on the pectorals, ventrals, and caudal.

An inhabitant of the Sargassum Seas, but occasional straggler to the North American coast.

CERATIIDÆ.

Pediculates non-pediculate and deprived of ventral fins, *i. e.*,

Pediculates diversiform in shape, with the mouth opening more or less upwards; the branchial apertures in the lower axils of the pectorals; no pseudobranchiæ; the dorsals represented by at least a frontal or superior rostral spine, the pectoral members not geniculated, with short pseudobrachia and three actinosts, and without ventrals.

Apparently inhabitants of the depths of the ocean in their adult condition, and, in some cases at least, near the surface in their juvenile state. All the known species are unicolored and blackish.

**Pterophryne*, πτερον, wing, *quasi* fin, and φρυνη, toad. If considered to be too near *Pterophrynus*, the genus may be called *Pterophryuoides* (φρυνοειδης, toad-like).

Synopsis.

1*a*. Mouth moderate; cephalic spine with its basal element exserted and continuous with the distal; pyloric cœca developed (2).

2*a*. A second dorsal spine typically developed; mouth with the cleft subvertical; 1st D. with few rays; branchiæ in 2½ pairs; branchial arches unarmed; skin with scattered spinigerous scutellæ ..... CERATIINÆ.

Ceratias.

1*a*. Mouth moderate; cephalic spine with its basal element subcutaneous, procumbent, and at right or acute angle with the distal; pyloric cœca none.

2*a*. A second dorsal spine developed; branchiæ in 2½ pairs; branchial arches unarmed; body naked.

3. Body and head compressed; mouth with the cleft nearly horizontal, and mandibular articulation behind eye ..... ONEIRODINÆ.

Oneirodes.

2. No second dorsal spine developed; branchiæ in ½2½ pairs; branchial arches armed with dentigerous tubercles; body with scattered tubercular scutellæ.

3. Body and head compressed; mouth with the cleft oblique; mandibular articulation under or behind eye ..... HIMANTOLOPHINÆ.

4*a*. Body oblong oval; dorsal fin with about 9 rays, and pectoral with about 12? ..... *Himantolophus.*

4*b*. Body short oval; dorsal fin with 4 rays, and pectoral with about 17 ..... *Corynolophus.*

CERATIINÆ.

Ceratiids with the body and head compressed; mouth with moderate and almost or quite *vertical* cleft; branchiæ in 2½ pairs; branchial arches unarmed; spinous dorsal represented by a rostral spine, as well as, generally, by a second, whose *basal element* is *exserted;* soft with few rays, placed quite far back of the head; pyloric cœca developed (2).

CERATIAS.*

Ceratiines with an oblong form; skin prickly; vomer toothless; cephalic spine elongated and with a simple capitate extremity; second dorsal spine well developed, and pectorals multiradiate (*i. e.*, with about 20 rays).

Ceratias Holbölliі.

1844—Ceratias Holböllii *Kroyer*, Naturhist. Tidskrift, 2. række, b. i, pp. 639–649.
1861—Ceratias Holbölli *Günther*, Cat. Fishes in Brit. Mus., v. 3, p. 205.

Ceratias with cephalic spine reclinable beyond base of caudal fin, and caudal fin longer than body exclusive of head.

Deep sea along Greenland (known from several specimens).

ONEIRODINÆ.

Ceratiids with the body and head compressed; mouth with moderate and almost *horizontal* cleft; branchiæ in 2½ pairs; branchial arches unarmed; spinous dorsal represented by a (1) rostral spine, whose basal

* *Ceratias*, κερατιας, *ov*, *ὁ*, one that has horns, in allusion to the frontal ray.

element is procumbent and subcutaneous, and (2) *a second spine, about intermediate between the first and the dorsal fin;* soft dorsal with about 4 rays; and without pyloric cœca.

ONEIRODES.*

Oneirodinæ with oval form; the skin naked; the vomer dentigerous; and the cephalic spine with a bulbous termination, surmounted by slender filaments in several transverse rows.

Oneirodes Eschrichtii.

1871—Oneirodes Eschrichtii *Lütken*, Overs. over Dansk. Vidensk. Selsk. Forhandl., 1871, pp. 57–74; res. fr., pp. 9–18, pl. 2.

Oneirodes with the terminal element of the cephalic spine rather longer than the proximal subcutaneous; the caudal shorter than the distance between its base and the branchial apertures; and the color black except the terminal half of the spinal bulb, which is whitish.

Deep sea off Greenland: known from a single specimen 205 millimetres long.

HIMANTOLOPHINÆ.

Ceratiids with the body and head compressed, with moderate oblique cleft mouth, the mandibular articulation under the eyes; branchiæ in $\frac{4}{2}2\frac{1}{2}$ pairs; branchial arches armed with dentigerous tubercles; spinous dorsal represented *only by a rostral spine*, whose basal element is procumbent and subcutaneous; and soft dorsal with about 5—9 rays.

HIMANTOLOPHUS.†

Himantolophines of an oblong oval form, a dorsal of about 9 rays, and pectorals with about 12 rays each (?).

Himantolophus Grœnlandicus.

1837—Himantolophus Grœnlandicus *Reinhardt*, Danske Vidensk. Selsk. Nat. og Math. Afh., 4. række, b. 7, p. 74.

Himantolophus with the height of the body equal to two-fifths of the length, and the frontal ray provided with 11 tentacles (Lütken).

Habitat.—Sea off Greenland (known only from the remains of a specimen 23 inches long).

CORYNOLOPHUS.‡

Himantolophines of an abbreviated oval form, a dorsal of about 5 rays, and pectorals with about 17 rays each.

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*Oneirodes, ὀνειρώδης, dream-like, in allusion to the small and almost covered eyes.

†*Himantolophus, ἱμᾶς, ἀντος*, a thong, and *λοφος*, a tuft.

‡ *Corynolophus, κορῦνη, ης*, "a stick with a knob at the end", or club, and *λοφος*, a tuft.

Corynolophus Reinhardti.

1878—Corynolophus Reinhardti, *Lütken*, K. Dansk. Vidensk. Selsk. Skr., Nat. og Math. Afh., 5. række, b. 5, p. 321, etc.

Corynolophus with the height of the body equal to three-fourths of the total length, and the frontal ray furnished with 8 tentacles.

Habitat.—Sea off Greenland (described from a specimen 14 inches long).

LOPHIIDÆ.

Pediculates with pseudobranchiæ, *i. e.*,

Pediculates with the body differentiated into a wide depressed head and contracted conical trunk; the mouth opening forwards and upwards; the branchial apertures in the inferior axils of the pectoral members; pseudobranchiæ; the spinous dorsal represented by a group of independent cephalic spines (3) and a small postcephalic finlet (with 3 spines); the pectoral members scarcely geniculated, but with elongated pseudobrachia, and with *three* actinosts; and with ventrals well developed.

LOPHIUS.*

Lophiids with vomerine teeth.

Lophius piscatorius.

Bellows-fish.

1758—Lophius piscatorius, *Linnæus*, Syst. Nat., 10 ed., t. 1, p. 236 (12 ed., t. 1, p. 402; Gml. ed., t. 1, p. 1479).
1815—Lophius foliatus, *Mitchill*, Trans. Lit. and Phil. Soc. N. Y., v. 1, p. 467.
1815—Lophius piscator, *Mitchill*, Trans. Lit. and Phil. Soc. N. Y., v. 1, p. 467.
1837—Lophius piscatorius, *Cuv. & Val.*, Hist. Nat. des Poissons, t. 12, p. 344, pl. 362.
1837—Lophius americanus, *Cuv. & Val.*, Hist. Nat. des Poissons, t. 12, p. 381.
1839—Lophius piscatorius, *Storer*, Boston Journ. Nat. Hist., v. 2, p. 350; Rep. Ich. and Herp. Mass., pp. 71, 404.
1842—Lophius americanus, *DeKay*, Zoology of New York, Fishes, p. 162, pl. 28, f. 87.
1853—Lophius americanus, *Storer*, Mem. Am. Acad. Arts and Sc., n. s., v. 5, p. 267; Hist. Fishes Mass., p. 101, pl. 18, f. 2.
1861—Lophius piscatorius, *Günther*, Cat. Fishes in Brit. Mus., v. 3, p. 179.
1861—Lophius americanus, *Günther*, Cat. Fishes in Brit. Mus., v. 3, p. 181 (d. s.).
1872—Lophius piscatorius, *Lyman*, 6th Ann. Rep., Inl. Fish., p. 44 (Waquoit Weir).

Lophius with a tridentate humeral spine, 11–12 rays in the dorsal fin, and the mouth behind the hyoid bone immaculate.

Habitat.—Coast waters from Newfoundland to North Carolina.

MALTHEIIDÆ.

Pediculates with the branchial apertures in the superior axils of the pectorals, *i. e.*,

Pediculates with a depressed body; the mouth subterminal or inferior, and the lower jaw generally received within the upper; the branchial apertures in the superior axils of the pectoral fins; no pseudobranchiæ;

* *Lophius*, the ancient Latin name of the type of the genus.

the spinous dorsal represented by a tentacle in a cavity overhung by the forehead, and the soft small and far behind; the pectoral members strongly geniculate, and with long pseudobrachia and three actinosts; and the ventrals well developed.

Inhabitants of temperate and tropical seas at moderate or great depths.

MALTHEINÆ.

Maltheids with a cordiform cephalic disk and a stout caudal portion, and with the frontal region elevated.

MALTHE.*

Maltheines of unique genus.

Malthe vespertilio.†

1758—Lophius vespertilio, *Linné*, Syst. Nat., 10 ed., t. 1, p. 236 (12 ed., t. 1, p. 402; Gmel. ed., t. 1, p. 1480).
1837—Malthea vespertilio, *Cur. & Val.*, Hist. Nat. des Poissons, t. 12, p. 440.
1837—Malthæa nasuta, *Cuv & Val.*, Hist. Nat. des Poissons, t. 12, p. 452. (In part.)
1837—Malthæa notata, *Cuv. & Val.*, Hist. Nat. des Poissons, t. 12, p. 453. (In part.)
1842—Malthea nasuta, *DeKay*, Zoology of New York, Fishes, p. 167. (In part; not figure.)
1842—Malthea notata, *DeKay*, Zoology of New York, Fishes, p. 167.
1842—Malthea vespertilio, *DeKay*, Zoology of New York, Fishes, p. 167.
1861—Malthe vespertilio, *Günther*, Cat. Fishes in Brit. Mus., v. 3, p. 200.

Malthe with the forehead produced into a more or less elongated subconical process, its width greater between the anterior angles of the orbit than between the posterior ones, and the frontal cavity higher than wide.

Newfoundland to West Indies.

Malthe cubifrons.

1836—Lophius (Malthe) cubifrons, *Richardson*, Fauna Bor.-Am., Fishes, p. 103, pl. 96.
1837—Malthæa nasuta, *Cuv. & Val.*, Hist. Nat. des Poissons, t. 12, p. 452. (In part.)
1842—Malthea nasuta, *DeKay*, Zoology of New York, Fishes, p. 166, pl. 28, f. 89. (In part, *i. e.* fig., copied from Richardson.)
1861—Malthe cubifrons, *Günther*, Cat. Fishes in Brit. Mus., v. 3, p. 203.

Malthe with the forehead decurved and in front with a button-like tubercle, the width between the anterior angle of the orbit nearly equal

*Malthe, *μάλθη*, the Greek name of a loose-bodied fish.—"Μάλθη signifie de la cire ramollie. On trouve ce nom dans Oppien parmi ceux de plusieurs grands poissons cartilagineux, et l'espèce qui le porte y est désignée comme remarquable par sa mollesse. Suidas, qui la place dans une énumération du même genre, dit qu'elle est difficile à vaincre. Sur ces deux traits Bélon a pensé que la *malthée* était la baudroie, et, bien que son opinion n'ait pas été adoptée, et n'ait peut-être pas dû l'être, M. Cuvier a cru pouvoir s'en prévaloir pour dériver de *μάλθη* le nom de *malthæa*, qu'il a donné à un petit genre démembré de celui des baudroies."—Cuv. et. Val., Hist. Nat. des Poissons, t. 12, p. 438.

†Whatever may be the value of the nominal species introduced by Cuvier and Valenciennes, all those found along the United States coast, recently examined by myself, belong to one species. I think, however, that formerly I saw a second species of the *M. vespertilio* type.

to that between the posterior ones, and the frontal cavity much broader than high.

Until lately, known from a single specimen obtained in Labrador by Audubon, the ornithologist, and now preserved in the British Museum. There is, however, a specimen in the collection of the Smithsonian Institution from St. Augustine, Florida, whence it was sent by Dr. J. M. Laing, U. S. A.

The relations of the North American genera to the other members of the families in question will be exhibited in the subsequent notes.

NOTE ON THE ANTENNARIIDÆ.

By THEODORE GILL.

The relations of the only known North American representative of the family of Antennariids to the other members of the family is exhibited in the following analytical synopsis, which is essentially the same as that published by the author in 1863. In the present synopsis, however, the most generalized forms (or those supposed to be such) are placed first and followed by those successively more aberrant or specialized. The two species hitherto retained under the generic designation *Brachionichthys* are also differentiated as distinct generic types. Dr. Lütken has recently expressed the opinion that *Pterophryne* and *Histiophryne* appear to be congeneric, but they really seem to be not even closely related.

1*a*. Head compressed; the rostral spine or tentacle as well as two other robust spines developed; soft dorsal well developed.

2*a*. Body oblong claviform; mouth comparatively small; palate unarmed; second and third spines approximated and well connected by membrane and forming a fin; pelvic bones short ..... BRACHIONICHTHYINÆ.

3*a*. First dorsal spine connected with second, and third with soft dorsal fin by an incised membrane ..... *Sympterichthys.*

3*b*. First dorsal spine free from second, and third from soft dorsal fin. *Brachionichthys.*

2*b*. Body oval, with tumid abdomen; mouth quite large; palate armed with teeth; second and third spines distant and not at all or scarcely connected; pelvic bones elongated ..... ANTENNARIINÆ.

3*a*. First and second dorsal spines disconnected; the first filamentous, with tentacle at end.

4*a*. D. 12, A. 7. Caudal peduncle free; skin smooth or scarcely granular; mouth oblique; wrists and pectorals slender; ventrals elongated; dorsal spines free from membrane; dorsal fin more than half as long as body; anal extended downward ..... *Pterophryne.*

4*b*. D. 12, A. 7—8. Caudal peduncle free; skin rough with spines; mouth vertical; wrists and pectorals widened; ventrals short; 3d dorsal spine partly immersed in skin; dorsal fin less than half as long as body; anal oblong ..... *Antennarius.*